Virginia Department of Transportation
Materials Division

Asphalt Plant Level I

Technician Proficiency Test

Student Name (print) _____

Student I.D. Number _____

Company Name
(or VDOT- Dist./ Div.) _____

Company Address _____

_____

Employer's Phone No. _____

		Test		Retest	
		P	**F**	**P**	**F**
AASHTO T30	Mechanical Analysis of Extracted Aggregates				
AASHTO T166	Bulk Specific Gravity				
AASHTO T209	Maximum Specific Gravity				
AASHTO T269	Percent Air Voids in Compacted Specimens				
VTM 102	Ignition Method (no oven calibration)				
AASHTO T312	Gyratory Compaction (pill only using gyro)				

Comments: _____

_____

_____

_____

_____

Student Signature _____ Date _____

Proctor Signature _____ Date _____

Mechanical Analysis of Extracted Aggregate
AASHTO T30 (1998)

1. Nest of Sieves: upper sieve No. 10 or 16 (2.00 or 1.18mm) sieve. lower sieve a No. 200 (0.075mm) sieve. _____ _____
2. Wetting agent on hand. _____
3. Oven or hot plate capable of maintaining 230 ± 9°F (110 ± 5°C). _____
4. Balance capable of weighing to 0.1 % of sample mass (sensitive to 0.1 gram). _____
5. Sample consisting of all aggregate after extraction and weighed to nearest 0.1 grams. _____
6. Minimum mass of mix sample based on nominal maximum size. _____
7. Sample placed in container and covered with water. _____
8. Wetting agent added. _____
9. Contents agitated vigorously. _____
10. Wash water poured through nest of sieves. _____
11. Washing continued until wash water is clear. _____
12. Material placed in pan. _____
13. Material dried to constant mass at 230 ± 9°F. _____
14. Material weighed to nearest 0.1gram. _____
15. Material sieved on specified sieve sizes. _____
16. Sieving continued until not more than 0.5 percent by mass of total sample passes a given sieve in 1 minute. _____
17. Each fraction of aggregate weighed. _____
18. Does summation of aggregate mass check against total washed dry mass within 0.2 percent? _____
19. All calculations performed correctly. _____

Bulk Specific Gravity of Compacted Bituminous Mixtures Using Saturated Surface-Dry Specimens AASHTO T166 - 00 Method A

1. Equipment

a. Balance and Suspension:

1. Conforms to M231 for class required (sensitive to 0.1 g). _____
2. Suspension from center of balance pan. _____
3. Suspension wire of smallest practical size. _____
4. Holder and sample completely immersed. _____
5. No trapped air bubbles exist under specimen. _____

b. Water Bath:

1. Equipped with overflow outlet. _____
2. Deep enough to completely immerse holder and sample. _____

c. Room Temperature Definition:

1. Room temperature 77 $\pm$ 9°F (25 $\pm$ 5°C). _____

2. Procedure

a. Molded specimens cooled to room temperature. _____

b. Mass of dry sample in air (A) determined in grams. _____

c. Sample immersed in water bath. _____

1. Immersed for 4$\pm$ 1 minutes. _____
2. Water at 77$\pm$ 1.8 °F (25 $\pm$ 1°C). _____
3. Specimen weight in water (C) determined. _____

d. Sample removed and blotted with damp towel. _____

e. Saturated surface-dry mass determined (B). _____

f. Percent water absorbed determined to be less than 2 percent. _____
% Water absorbed = (B-A)/(B-C) x 100

g. Bulk specific gravity calculated: A/(B-C). _____

h. Bulk specific gravity reported to nearest 0.001. _____

Maximum Specific Gravity of Bituminous Mixtures
AASHTO T209

1. Flask or bowl calibrated.

   a. Flask or Bowl weighed suspended in water until it reaches a constant weight (B). _____

2. Sample obtained by splitting or quartering. [Indicate method used] _____

3. Mass of sample as follows (samples larger than the capacity of the container may be divided into suitable increments, tested and the results averaged). [Indicate particle & sample sizes used] _____

Largest Particle Size	Minimum Sample Size (g)	
2 in (50 mm)	6000	_____
1½ in (37.5 mm)	4000	_____
1 in (25 mm)	2500	_____
3/4 in (19 mm)	2000	_____
1/2 in (12.5 mm)	1500	_____
3/8 in (9.5 mm)	1000	_____
No. 4 (4.75 mm)	500	_____

4. Particles of sample separated. _____

5. Care used not to fracture mineral fragments. _____

6. After separating, fine aggregate particles not larger than ¼ in (6.3 mm). _____

7. Sample at room temperature. _____

8. Flask or Bowl weighed in air (C). _____

9. Sample placed in flask or bowl and weighed in air (A). _____

10. Water at approximately 77°F (25°C) added to cover sample. _____

11. Vacuum increased until manometer reads 27.75 $\pm$ 2.25 mm Hg. _____

12. Entrapped air removed using partial pressure for 15 $\pm$ 2 minutes. _____

13. Container and contents agitated vigorously by mechanical device or manual shaking at intervals of 2 minutes. _____

14. Release of entrapped air facilitated by addition of wetting agent. (optional) _____

15. Release of vacuum by increasing pressure at a rate not exceeding 60mm Hg (8 kPa) per second. _____

16. Bowl and contents immersed in water for 10 $\pm$ 1 minutes _____

17. Weight recorded (D). _____

18. Maximum specific gravity calculated and reported to nearest 0.001. _____
    Max. specific gravity = (C-A) / (C-A)(D-B)

Percent Air Voids in Compacted Specimens
AASHTO T269

1. Bulk specific gravity determined according to AASHTO T166 _____

2. Maximum specific gravity determined according to AASHTO T209 _____

3. Percent air voids calculated in accordance with the following: _____

Percent air voids = 100 x [1-(bulk sp gr/ max sp gr)]

Ignition Method
Virginia Test Method 102 (VTM-102)

1. Ignition Oven Calibration Factor Procedure ***Not required for Asphalt Plant Level I***

2. Sample Preparation:

   a. If necessary, mixture warmed in pan (257 ± 9°F) to constant weight. _____

   b. Sample obtained by splitting or quartering. [Indicate method used.] _____

   c. Size of Sample _____

Nominal Maximum Aggregate Size	Minimum Sample Mass in grams	
1½	4000*	_____
1 in	3000*	_____
3/4 in	2000	_____
1/2 in	1500	_____
3/8 in	1200	_____
No 4	1200	_____

   * Sample may be split and results combined using weighted average

   d. Sample weight does not exceed 800 grams of the minimum sample weight. _____

   e. Sample baskets tared and weight recorded. _____

   f. Sample divided into equal portions for top and bottom basket. _____

   g. Baskets set in drip pan when loading and care taken not to lose fines. _____

   h. Sample spread with heated spatula into thin even lift. _____

3. Determination of Asphalt Content by Ignition Method

   a. Furnace preheated to 538°C (1000°F). _____

   b. Correction (calibration) factor for specific mix design entered. _____

   c. Sample weight with baskets determined and recorded to nearest gram. _____

   d. Initial sample weight entered and verified in furnace controller. _____

   e. Sample loaded into furnace and total weight (including baskets) verified prior to initiation of test. _____

Ignition Method
VTM-102 (continued)

f. Sample removed promptly when audible stable indicator indicates constant weigh achieved. _____

g. Sample allowed to cool to room temperature in safety enclosure. _____

4. Gradation Determination

a. Entire contents of sample baskets and drip pan emptied into flat pan, sample baskets cleaned into flat pan with a wire brush. _____

b. Sample weight determined to nearest 0.1 percent (1 gram for sample sizes greater than 1000 grams) for gradation _____

c. Gradation analysis performed in accordance with AASHTO T30. _____

Standard Method for Preparing & Determining the Density of Hot-Mix Asphalt (HMA) Specimens by Means of the Superpave Gyratory Compactor AASHTO T 312 (Was AASHTO TP 4)

1. Gyratory Compactor

   a. One from approved list. _____

2. Molds (at room temperature)

   a. Inside diameter 149.90 to 150.00 mm. _____

   b. At least 250 mm high. _____

   c. Walls at least 7.5 mm thick. _____

3. Ram and base plate faces

   a. Ground flat. _____

   b. Diameter of 149.50 to 149.75 mm. _____

4. Balance capable of weighing pills readable to 1 gram. _____

5. Forced draft oven thermostatically controlled to $\pm$ 3°C. _____

6. Thermometers armored, glass or dial-type with metal stems. _____

7. Verification of calibration (following items checked periodically)

   a. Ram pressure _____

   b. Angle of gyration _____

   c. Gyration speed _____

   d. LVDT or other continuous height recorder _____

   e. Mold dimensions _____

   f. Plate faces _____

   g. Oven temperature _____

Standard Method for Preparing & Determining the Density of Hot-Mix Asphalt (HMA) Specimens by Means of the Superpave Gyratory Compactor AASHTO T 312 (continued)

8. Preparation of Apparatus

a. Main power switch turned on for required warm up period. _____

b. Angle, pressure and gyration level set. _____

c. Bearing surfaces lubricated per manufacturer's instruction _____

9. (Preparing Mix in Lab) not required for Asphalt Plant Level I _____

10. Preparation of Mixture - Plant Prepared HMA

a. Loose mix brought to compaction temperature by uniform heating. _____

11. Compaction of Specimens

a. Mold, base plate, and upper plate (when required) removed from oven and paper disk placed on bottom of mold. _____

b. Mixture placed in mold in one lift, leveled, and paper disk and upper plate (when required) added. _____

c. Mold loaded into compactor and compaction started. (height recorded to nearest 0.1 mm) _____

d. Compactor shuts off when completed. _____

e. Mold removed and specimen extruded. _____

f. Paper disks removed. _____

g. Specimens conform to height requirements of 115 $\pm$ 5 mm. _____